Course Title: Artificial Intelligence **Sheet #3**

The file ex2data1.txt contains the dataset for problem1.

Problem1:

Suppose that you are the administrator of a university department and you want to determine each applicant's chance of admission based on their results on two exams. You have historical data from previous applicants that you can use as a training set for logistic regression. For each training example, you have the applicant's scores on two exams and the admissions decision.

Your task is to build a classification model (logistic regression model) that estimates an applicant's probability of admission into a university based the scores from those two exams. Follow the following instructions:

- Before starting to implement any learning algorithm, it is always good to load the data and display it on a 2-dimensional plot.
- Implement the cost function and gradient for logistic regression, where the cost function in logistic regression is

$$J(\theta) = \frac{1}{m}\sum_{i=1}^{m}\left[-y^{(i)}\log(h_\theta(x^{(i)})) - (1-y^{(i)})\log(1-h_\theta(x^{(i)}))\right],$$

and the gradient of the cost is a vector of the same length as θ where the j^{th} element (for $j = 0, 1, \ldots, n$) is defined as follows:

$$\frac{\partial J(\theta)}{\partial \theta_j} = \frac{1}{m}\sum_{i=1}^{m}(h_\theta(x^{(i)}) - y^{(i)})x_j^{(i)}$$

- Use the final θ values obtained by the gradient decent algorithm to plot the decision boundary on the training data.

The file ex1data2.txt contains the dataset for problem2.

Problem2:

Suppose you want to use multivariate linear regression to fit the parameters of the given data. ***Use both gradient descent and the normal equation to fit the parameters.***

Which one do you prefer? Why?

Best wishes

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